

INCH

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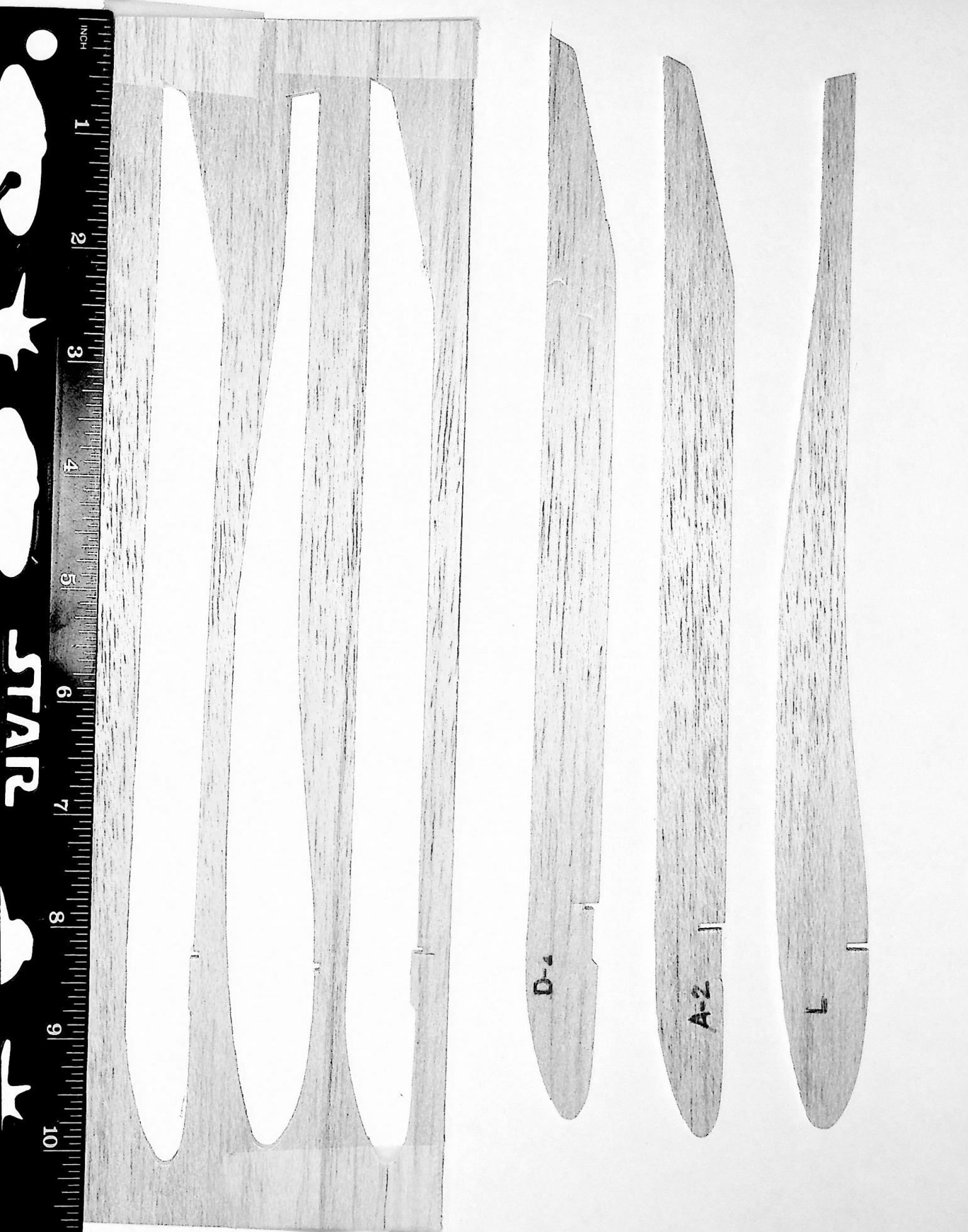
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D-2



D-2



INCH

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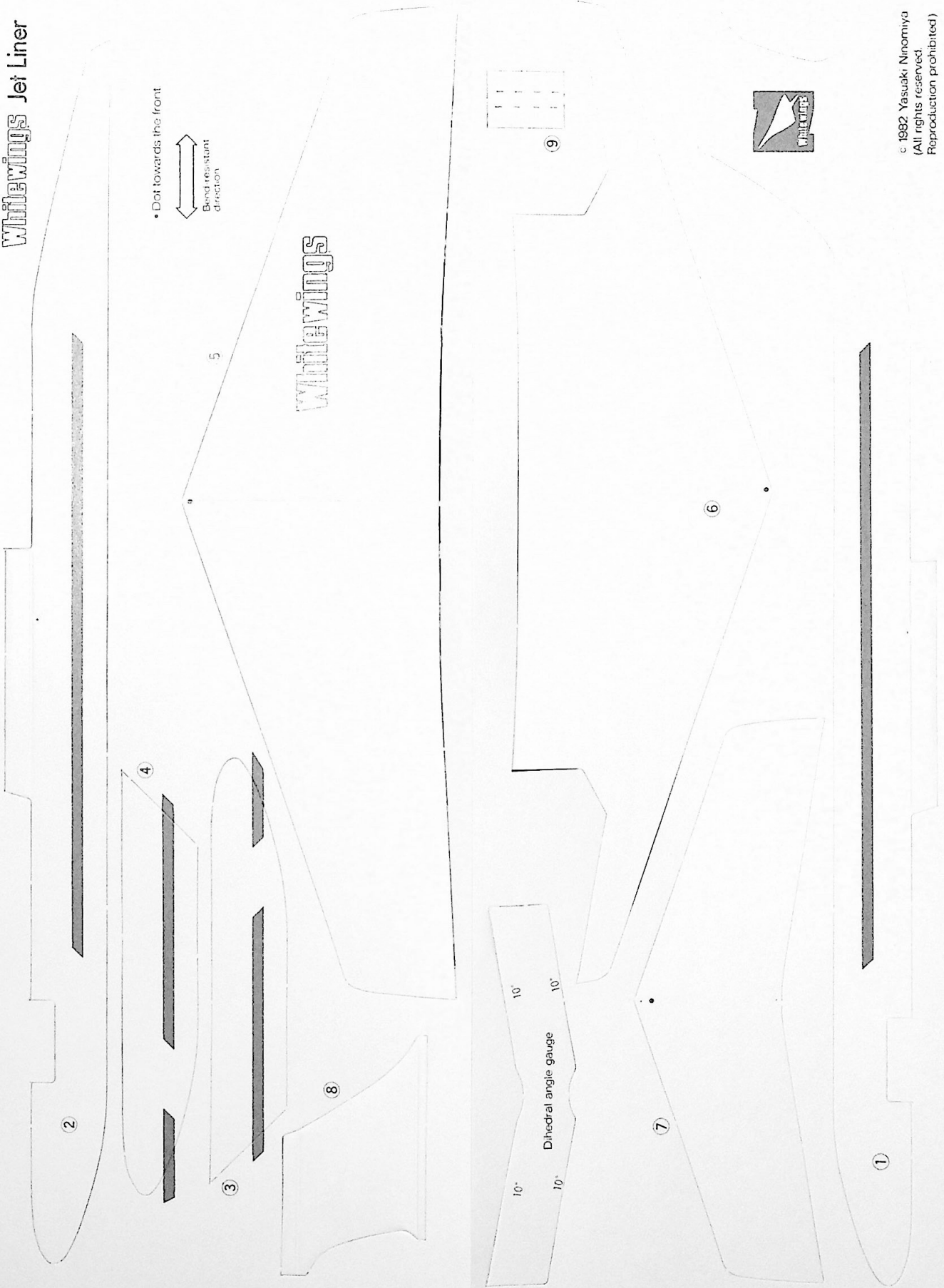
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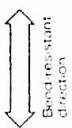
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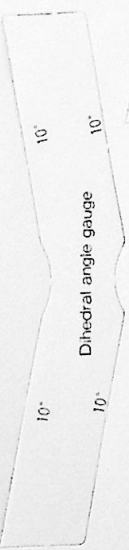
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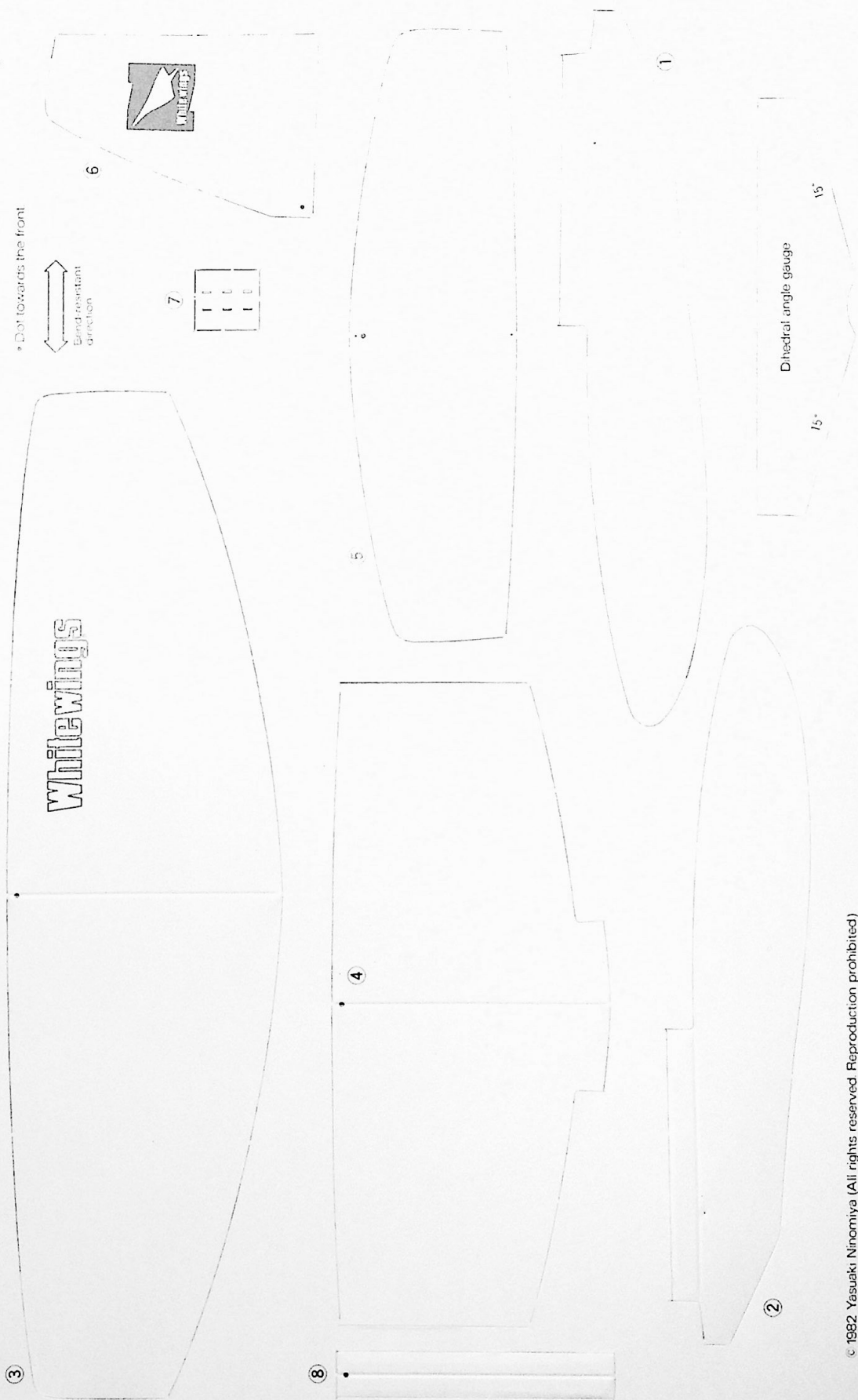
• Dot towards the front



Whitewings

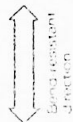


WhiteWings Racer 508 Sky Cub



Whitewings Racer 527 Sky Fish

• Dot towards the front



③

Whitewings

⑥



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①



②

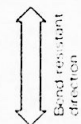
15°

Directed angle gauge

15°

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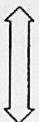
WhiteWings

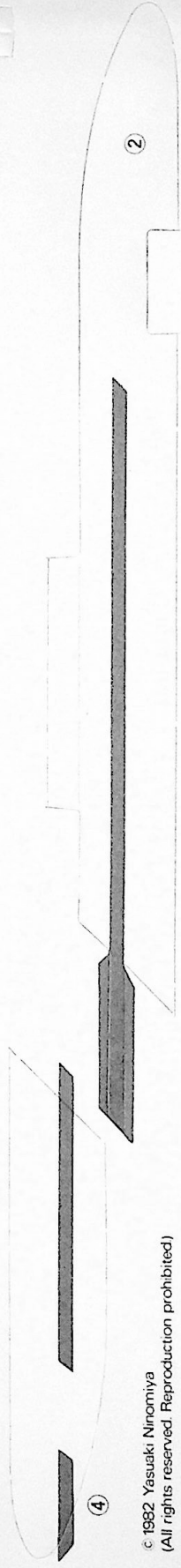
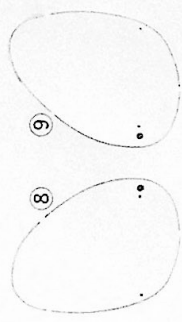
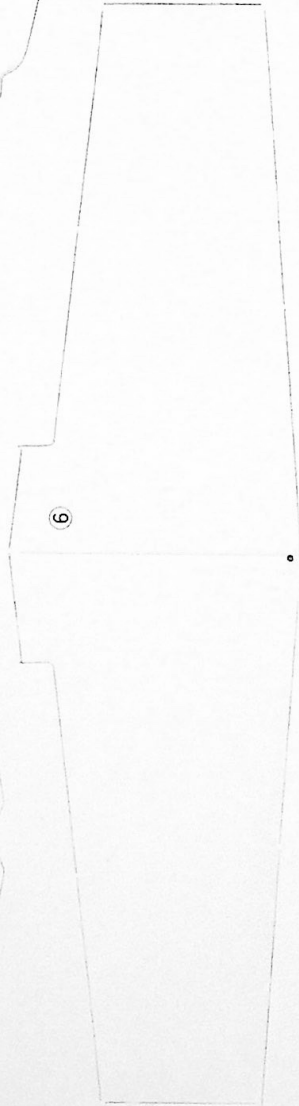
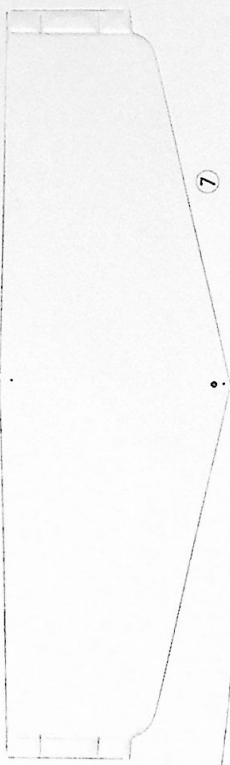
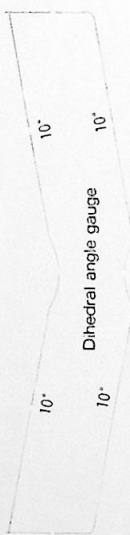
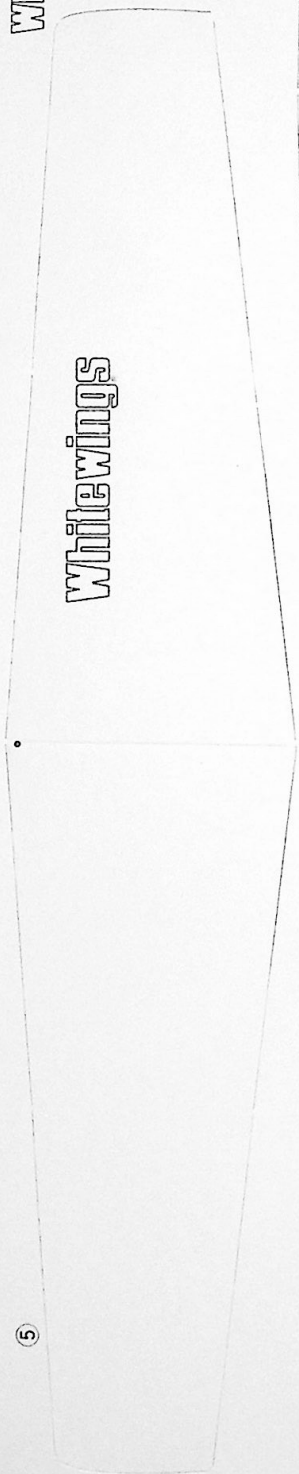


• Dot towards the front
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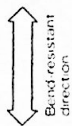
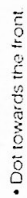


Whitewings

• Dot towards the front

 Bend-resistant
 direction



WILKING



Send a white bird soaring through the sky

WhiteWings®

Let me introduce you to "WhiteWings - Balsa". These planes represent a further development of the basic paper airplane. In other words, with wings of paper and bodies of balsa, this set combines the best qualities of both components. The result? Sturdy wings which stand up to the wear and tear of many flights, and a fuselage that doesn't twist or bend out of shape, making it easy to adjust for flight.

Adding to these merits, the whole plane is light, making for excellent flight performance, and the models are easy to fly.

Each of the 3 racer models in this kit have achieved flight records of several minutes. I'd like you all to build these planes and then try for a flight record. I'm sure you'll set some good records.

June, 1992

Yasuaki Ninomiya



DESIGNER'S PROFILE

Dr. Yasuaki Ninomiya, born in 1926, has been fascinated by airplanes since early childhood. He received his doctorate in 1962 in the field of microwave measurement theory. He is recognized as a pioneer in microwave communications engineering from his work as a leading researcher at the Electrical Communications Laboratory of the Nippon Telegraph and Telephone Corporation from which he retired in 1984. He is currently a member of the Japan Industrial Designer's Association.

Drawing upon this distinguished background and expertise, Dr. Ninomiya designs aviationally sound and sleek, high performance paper planes based upon principles of industrial design and mechanical functionality. Convincing evidence of his talent is his garnering of the grand prizes in the Durand Flight and Distance Flight categories of the 1st International Paper Plane Contest (Pacific Basin Division) in San Francisco in 1967. He later served as a judge in the 2nd Great International Paper Plane Contest, held in Seattle, Washington in May 1985.

He also holds a private plane operator's license and tries to get into the pilot's seat of his Cessna 182 whenever his busy schedule permits.

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Pre-cut Volume 1

White Wings®

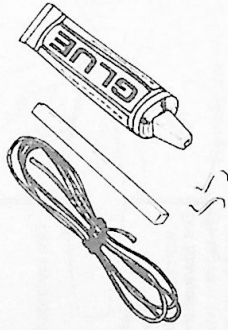
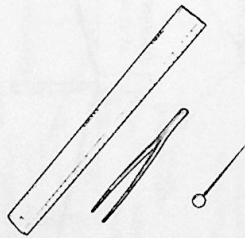
EXCELLENT GLIDERS

ASSEMBLY INSTRUCTIONS

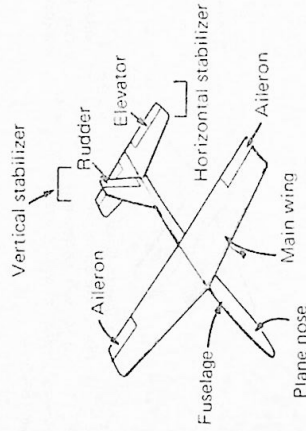
FLIGHT INSTRUCTIONS

HOW TO BUILD "WHITE WINGS"

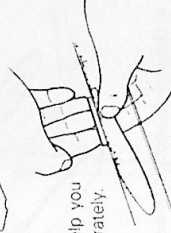




Take out each part carefully.



Hold a ruler to help you fold the tabs accurately.



● **RULER:** Used to fold the pieces and make creases accurately.

● **TWEEZERS:** Used for checking the center of gravity.

● **STRAIGHT PIN:** Used for making pin holes.

Materials marked with * are included in this kit.

● **GLUE:** A clear, fast drying glue is most suitable; for instance, Dupont's "Duco Cement" or Allen Products Corporation's "Seal All." These can be bought at your local drugstore or stationery store.

● ***HOOK:** Used when plane is launched by catapult.

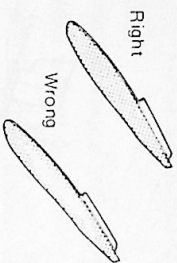
● ***RUBBER BAND AND ROD:** Used for making a rubber band catapult.

The figure shows the parts of a plane and what they are called. When "the right side" (or "the left side") of a plane is mentioned, it always means the right hand side (or left hand side) of an imaginary pilot sitting in the cockpit.

Take out each part carefully. Bend the tabs for the main wing and stabilizer before gluing the fuselage together. Bend the tabs using a ruler to make sure the tabs are neatly folded.

GLUING

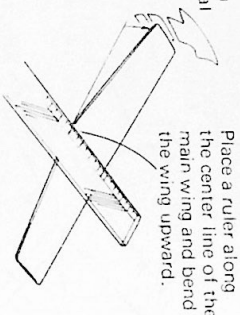
Spread glue evenly over the entire surface to be glued.



If the glue is applied unevenly, the plane will not be sturdy.

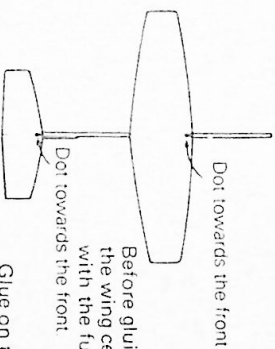
Apply the glue evenly and quickly and glue the pieces together, making sure that the assembled pieces do not slip out of position. If the glue is insufficient, the pieces will not be firmly glued together, resulting in weak construction and poor flying performance. In order to assemble a sturdy fuselage, after gluing on each piece, place the assembled pieces inside a folded piece of scrap paper and press out the excess glue with your fingers. Spread several layers of large scrap paper over a desk or other flat

Make a dihedral angle.



Place a ruler along the center line of the main wing and bend the wing upward.

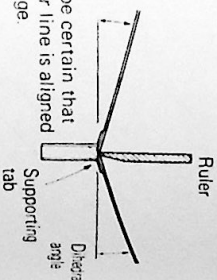
surface for protection. Set the newly glued main wing and fuselage on the papers to dry for at least 5-6 hours. Place a ruler along the center line of the main wing and bend the wing slightly upward (to make a "dihedral angle") as shown in the figure. Since each plane has a different dihedral angle, be sure to refer to the specific angle described in the assembly instructions for the individual model. Take out and use the appropriate gauge.



Before gluing be certain that the wing center line is aligned with the fuselage.

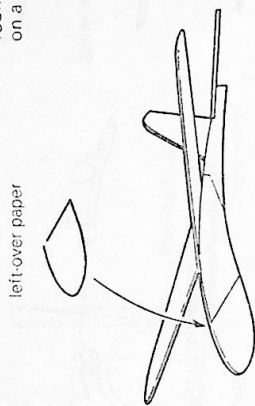
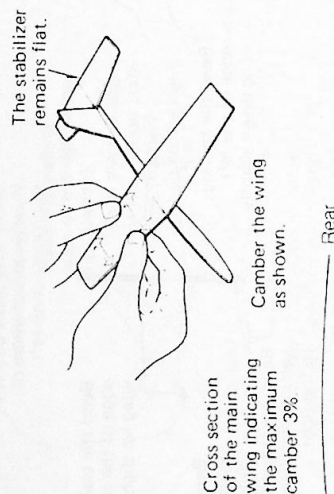
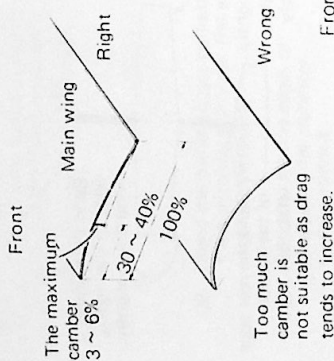
Glue on the horizontal stabilizer in the same way as the wing.

When gluing the main wing and horizontal stabilizer to the fuselage, make sure that the center line is properly aligned lengthwise with the center of the fuselage. You will find that if you glue the stabilizer onto the fuselage before gluing on the main wing, assembly will be much easier. The importance of gluing the main wing firmly to the fuselage cannot be overemphasized. In order not to leave any gap between the main wing and the body, press down firmly on the center of the main

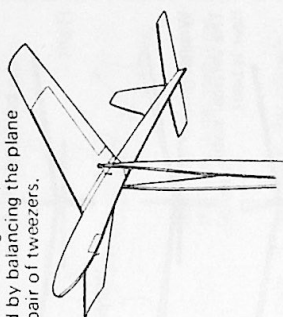


wing with the sharp edge of a ruler as shown. At the same time press up on the supporting tabs of the main wing from the underside. Keep pressing down on the main wing center line for several minutes. After gluing the main wing and stabilizers onto the fuselage, let it dry thoroughly for 3-4 hours.

NOTE: Since the balsa fuselages are slightly bigger than the paper parts you may shave off the protruding edges after gluing on the paper body parts.



The center of gravity can be found by balancing the plane on a pair of tweezers.



After the wing has been attached to the body and the glue has set for at least 3-4 hours and has thoroughly dried, you are ready to put the finishing touches on your paper plane.

To make a truly high performance plane, it is important that the cross section of the main wing be shaped in such a fashion as to minimize drag and maximize lift. To achieve this, the main wing should be slightly curved (called cambering the wing).

Use the figure above as a guide to give an appropriate camber to the

main wing.

The maximum camber point should be between a distance of 30% and 40% from the front edge of the main wing. To make the proper curve, bend the main wing slightly in the manner shown in the figure. Only the main wing is to be cambered. The stabilizer should be left flat.

Since the precise method of cambering differs from plane to plane, you should refer to the assembly instructions for the particular model you're working with.

The pin hole on the fuselage under the wing indicates the best location for the center of gravity.

To test to see if the center of gravity is properly aligned or not, take an open pair of scissors or tweezers and balance the plane on the two tips at the pin hole as shown in the figure.

All planes in this kit are designed to have the center of gravity aligned with the pin hole without placing on extra weight. However, you may not be able to get the balance at the pin hole depending upon the weight of each balsa body and the

amount of glue applied. In that case, affix a small piece of the left over paper in an appropriate size to the plane nose or the end of the fuselage.

For waterproofing you may apply a very thin coat of clear lacquer to your plane.

TEST FLIGHT

Check the plane by viewing it from the back and the front.



Warped wings



The vertical stabilizer is bent.

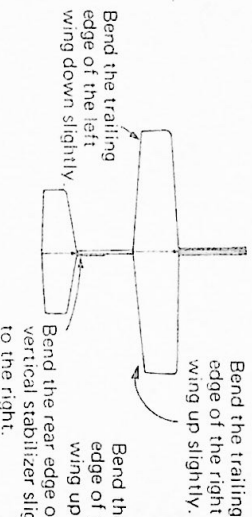


A warped horizontal stabilizer

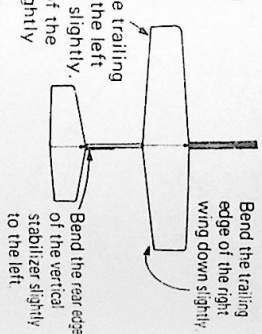


Throw the plane gently so that it will fly smoothly.

How to adjust when the plane curves left



How to adjust when the plane curves right



One of the secrets of flying a paper plane well is to view the plane closely from a head-on position and straighten out all warps.

bends or twists with your fingers. Inspect your plane thoroughly from the front:

- 1) Are both right and left main wings straight, perfectly matched, and are both inclined at the same angle?
 - 2) Is the horizontal stabilizer warped or bent?
 - 3) Is the vertical stabilizer warped or bent?
- Check for these defects and straighten out the bent or warped areas gently and

carefully. Inspect your plane from the rear and check for defects in the same manner as above.

After finishing your plane, the importance of following the test flight and adjustment instructions carefully cannot be overemphasized!

If you continuously repeat the test flight and adjustment procedures, adjusting your plane slowly but surely, you will finally arrive at a point where your plane will always fly smoothly and in a straight line. A perfect flight every time!

Try to test fly your plane when there is a gentle breeze. If there is a gentle breeze, always throw your plane straight into the wind.

When test flying your plane indoors, always try to throw it toward a curtain. Also, don't throw it upward but, as when launching any glider, toss it gently forward, aiming it horizontally or slightly downward.

The first thing to look for when test flying your plane is whether it flies to the left or right. If so, perform the following adjustments and your plane will fly straight. If a paper plane curves to the left or right, it is

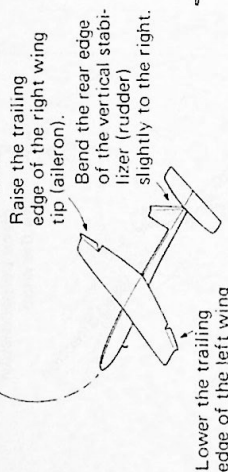
always because there is a bend or a warp somewhere on the plane. Therefore, the first step is to examine the plane again thoroughly, and straighten out the affected parts with utmost care.

If the plane still curves to the left or right, bend the trailing edges of both the main wings (ailerons) and the vertical stabilizer (rudder) in the appropriate directions, according to the instructions in the accompanying figure in order to correct this fault and ensure a straight flight.

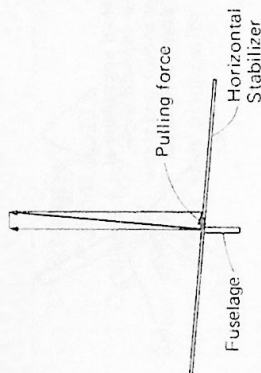


- a)..... Bend the trailing edges of the horizontal stabilizer slightly downward.
 b)..... Ideal
 c)..... Bend the trailing edges of the horizontal stabilizer slightly upward.

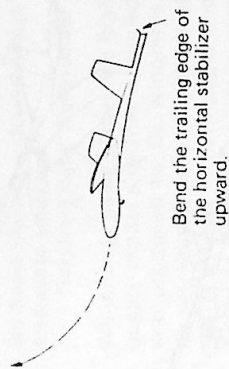
- If you want your plane to curve to the right:



- If you want your plane to curve to the left, bend the aileron and rudder in the opposite direction.



- If you want the plane's nose to point up:



- Conversely, if you want the plane's nose to dip down, bend the trailing edge of the horizontal stabilizer downward.

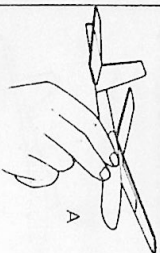
The second thing to test for is to see whether or not the nose gradually goes up and the plane loses speed; also watch if the plane's nose rises up, then suddenly dips down. This is known as stalling. If the glider does this, a smooth flight pattern can be assured by adjusting the back edge of the horizontal stabilizer (elevators).

After the test flying is over, don't touch the wings at all. When holding your plane, always hold it by the nose.

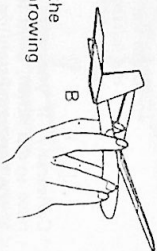
When flying your plane outdoors, if you want to make your plane curve to either direction, you can do so by bending the ailerons and rudder, as shown in the top figure. (It's not necessary to make incisions in the wings; just bend the appropriate areas slightly with your fingers to adjust the ailerons and rudder.)

Alternatively, you can tilt the horizontal stabilizer. This is because the planes in this kit are designed so that they have lifting force in the horizontal stabilizer as shown in the accompanying figure. Therefore, if you tilt the horizontal stabilizer to the right, the pulling force to the right as shown causes the nose of the plane to curve left.

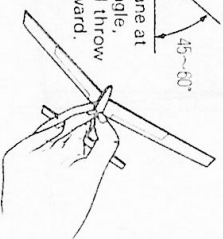
The ups and downs of the nose depend upon the control of the horizontal stabilizer as shown.



How to hold the plane when throwing by hand



Hold your plane at an inclined angle, as shown, and throw it up and forward.



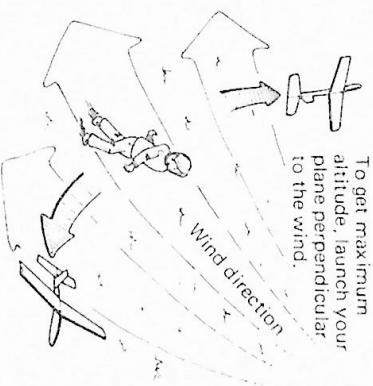
Now that the test flying is over, let's go outside to a wide open space to fly your plane!

If you are flying your plane outside with a wind blowing and want to keep your plane's flight pattern within a limited area, it is best to stand in an upwind position and throw your plane with the wind. Always be sure to return to the original upwind position for launching in order to prevent the plane from gliding beyond the flying area.

To throw your plane high, there are two ways to hold it, as shown in the figure, either by grasping the body

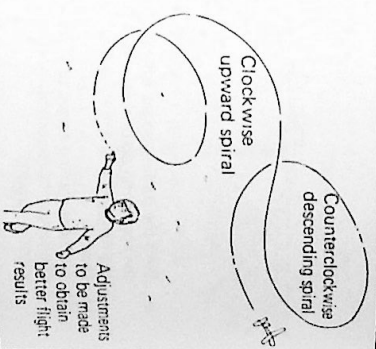
with your fingertips (A), or by placing your index and middle fingers behind the main wing on both sides of the fuselage (B). Use whichever method you find easiest and most natural.

If you hold the plane horizontally, and throw it up and forward, it will "loop the loop" and dive down, so it is very difficult to get it to glide at a high altitude. In order to overcome this difficulty, tilt the plane at a 45-60 angle when throwing. Your plane will curve outward as it gains altitude, then it will gradually level off and glide on a straight course. If your plane still tends to "loop the loop",



bend both rear, edges of the horizontal stabilizer slightly downward to minimize this tendency.

Contrary to test flying instructions, it's great to launch your plane perpendicular to the wind when "highflying" it. The reason for this is that when throwing your plane upwind, the plane has a tendency to loop; conversely, when throwing your plane downwind, the plane has a tendency to stall, due to the decreased relative airspeed over the wings. When throwing the plane perpendicular to the wind, neither of these faults is apparent, so it is easier



to obtain good flight results.

If an especially large wide open space is available, it's good to fly your plane in the following manner, before launching, adjust the main wing and vertical stabilizer in the directions necessary for a left turn. Then, take the plane in your right hand, incline the plane to the right and throw it upward if you do this, the plane will spiral upward in a clockwise fashion until it has obtained a considerable altitude, then it will slowly spiral to the left, in counterclockwise fashion, for its descent. If your plane has been adjusted well, it will remain aloft for 15-20 seconds or more.

Set Some Records with whitewings!
Attempt to equal the
"lost from sight" flight record!

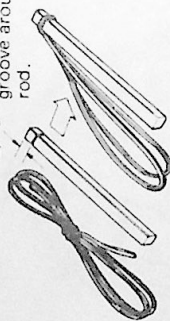
Whitewings balsa planes are high quality model airplanes designed and produced by Dr. Ninomiya. He developed them with the best characteristics of both paper and balsa in mind. The racer type planes are all top flight performers. The racer 527 Sky Fish has been reported, fantastic though it may seem, "lost from sight" after a flight of 7 minutes, 5 seconds. "Lost from sight" is the point at which a model airplane, riding higher and higher in the thermals, finally disappears from sight. It is really exciting and impressive to watch one of these white planes flying up into the blue sky, getting smaller and smaller and then finally "disappearing"!
Give it a try with Whitewings!

Precautions for Rubber Band Catapult Launching!!

Please observe the following rules when launching your planes with the catapult:

- * Because the planes take off with tremendous speed, it is too dangerous to use the catapult indoors, in shopping plazas, small parks, or anywhere there are lots of people. If you're very careful, you might be able to safely launch your planes by hand in these areas.
- * Even when in a wide open space, please be careful.
- Keep these safety rules in mind and enjoy flying your planes.

3/16" Make a little groove around rod.

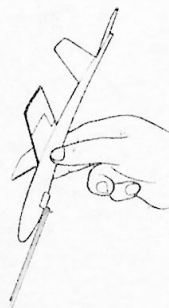


How to make a rubber band catapult

If you use a rubber band catapult, you will be able to fly your plane at a high altitude for a long time. Another advantage of using the catapult is that you can carefully control the angle of the plane when launching, thereby ensuring a proper flight course.

A catapult can be made easily from the included wooden rod and rubber band. Make a groove at the place shown in the figure and fasten the rubber band tightly onto the rod in the groove, making a double strand 20 inches long. When launching by catapult, suspend the fuselage with your fingers

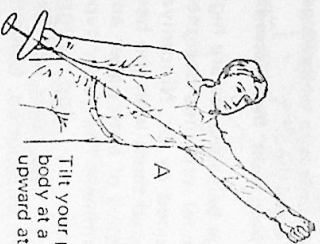
How to hold a plane when you launch it by the rubber band catapult



as shown in the figure. Then pull the plane back, being careful not to bend the fuselage. Try launching with just a little tension at first to check your plane's overall condition. If the plane is well adjusted, then you may go ahead with a true launch, but too much tension on the band will cause flutter. On a real plane, flutter will cause disintegration in mid-air. Flutter is occurring when your paper plane makes a vibrating sound. To avoid this problem, try not to put too much tension on the rubber band.

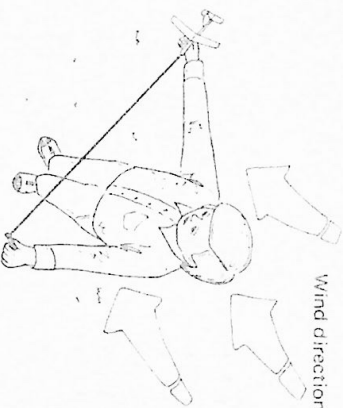
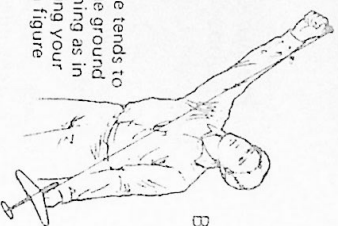
CATCHING THERMALS

Launching by the catapult

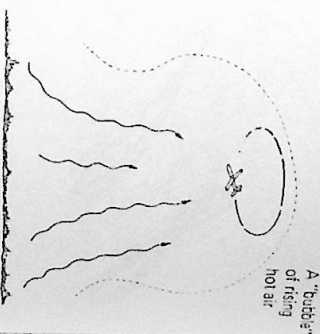


Tilt your plane away from your body at a 60°-90° angle starting upward at a 45° angle.

If your plane tends to plunge to the ground when launching as in A, try copying your launch from figure B.



Wind direction



When using a catapult, as when handthrowing your plane, incline your plane 60°-90° from the horizontal to avoid loops. Bending the elevators downward slightly also serves to discourage loops.

When considering the proper inclination that your plane should have when catapulting it, you must remember that if you have a plane that tends to curve to the right, and you incline it with the right wing downward (as in Figure A), the plane will tend to plunge down to the ground. If you try switching hands and incline the left wing downward (as in Figure B), I guarantee that you will obtain better flight results.

When you launch your plane by a rubber band catapult, pay attention to the wind direction. Stand with your back to the wind to prevent the plane from veering toward you in the wind. Also, if you stand facing the wind, the plane will not make a smooth take-off and may be damaged by hitting against the rod of the catapult.

In order for a paper plane to stay aloft for over 30 seconds, it must make use of rising columns of warm air, thermals. Thermals originate when the earth's surface is heated by the sun.

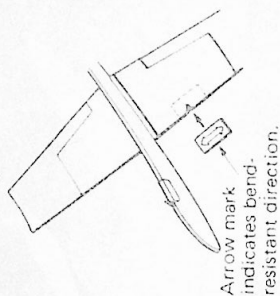
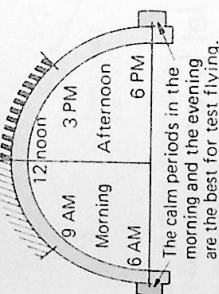
To enable your plane to make the best use of these thermals, it's best to adjust it to fly in a circular pattern, then launch or throw it as high as you possibly can. Although invisible to the naked eye, there are what can be called "bubbles" of warm rising air, like that shown in the accompanying figure, over patches of heated ground. Therefore, if you throw your plane as stated above, getting it to go around in circles, and the plane enters one of these "bubbles", its chances for remaining inside this "bubble" for a considerable length of time are increased.

REPAIRS

Repairing the wings

9 AM-noon is the best time to make use of thermals.

Winds get strong in the afternoon.

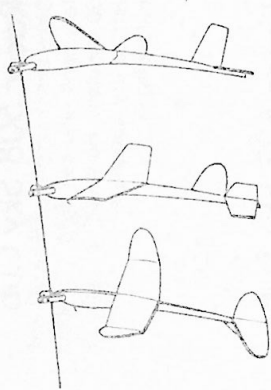


To patch a torn wing apply a small piece of paper.

Even if your plane becomes damaged, if you repair it, you should be able to fly it again and again.

If the wings or stabilizers are bent or torn, reinforce the damaged parts from the outside by gluing on small pieces of paper, as shown in the figure. These small pieces of paper should preferably be pieces of scrap paper left over from building your plane. These pieces of paper are bend-resistant in the direction of the wing tips so be sure to cut them out and apply them in the proper direction. (The bend-resistant direction of the paper is indicated by an arrow on each model sheet.)

STORAGE



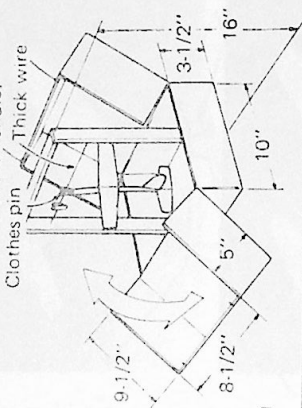
Stretch a wire across an open space and hang your planes up on it with clothespins.

A high viscosity cyanoacrylate is best for repairing a broken balsa body. When using it, be careful not to get it in your eyes nor smear your fingers with it.

If your paper planes are well made, you should be able to preserve them with minimum care, thus enabling them to fly for many years. For storing a large number of planes when not in use, you should stretch a piece of wire between two hooks and fasten them with clothespins. Let them hang vertically as shown in the figure. This has the advantage of taking up only a small

SAFE CARRYING

Cut just inside the corners at the four places marked for the handle.



Clothes pin Thick wire

amount of space, and also of minimizing the accumulation of dust on the wings.

In order to transport your paper planes safely from your home to an open area, I recommend using a carrying case. You can make it by yourself from a cardboard carton or a light wooden box. The carrying case should be large enough to accommodate each plane in its own space without overlapping with the others so that the planes are ready to fly with only a little adjustment. Here is one example of a carrying case I have made.

HOW TO BUILD "WHITE WINGS"

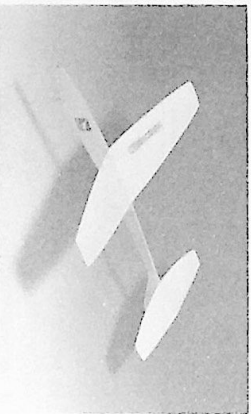
Racer 508 Sky Cub

Since this is simply constructed with few parts, you can build it in about 30 minutes. However, it should be left to dry completely for 3 hours before flying.



Racer 527 Sky Fish

This model can be assembled in about 30 minutes. Fly it after the glue has completely dried. This plane has excellent flight performance and has been reported, lost from sight, after 7 minutes, 5 seconds in flight.



Racer 531 Pheasant

Just like the Sky Cub or Sky Fish, this model can be assembled with just a few parts in a short time. The canopy drawn at the plane nose makes the plane look beautiful.



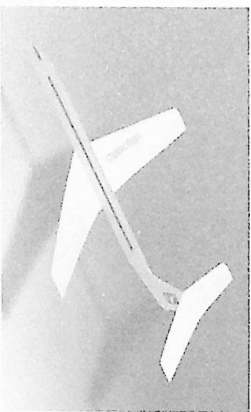
Prop Liner

This "classic" model has excellent stability and flight performance.



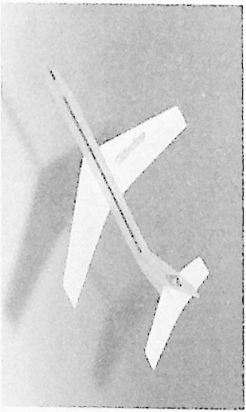
Jet Liner

It's enjoyable to just watch its form. You can easily obtain high altitude with this plane. Since the main wings are sweptback, however, this model will stall and go into "spin" easily. Should this occur, carefully adjust the horizontal stabilizer.



Fan Liner

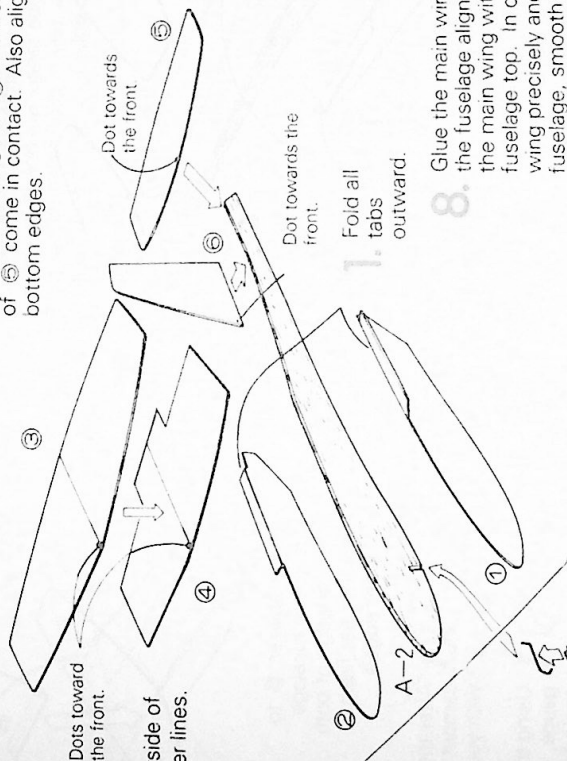
This is a model of an ordinary passenger jet. As you can fly this model more easily than the Jet Liner, which employs the "T-tail stabilizer", I would like to recommend to move on to the Jet Liner after you achieve excellent flight performance with this model.



Whitewings Racer 508 Sky Cub

GLUING INSTRUCTIONS

Glue the parts together in the order indicated. Use the balsa marked A-2 for this model.



Dots toward the front.

4. Glue ④ to the underside of ③, aligning their center lines.

7. Place a ruler along the center line of the main wing (③ + ④) and bend each side up individually to make a dihedral angle of 15° (Use the dihedral angle gauge.)

2. Glue ① and ② to both sides of the balsa body aligning their edges flush with those of the plane nose.

3. Insert the hook into the fuselage and secure it by gluing on folded

6. Attach the vertical stabilizer ⑥ to the right hand side of the fuselage, ensuring that the rear edge of ⑥ and front edge of ⑤ come in contact. Also align their bottom edges.

Dot towards the front

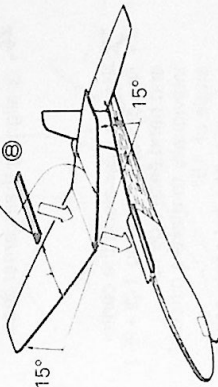
Dot towards the front.

1. Fold all tabs outward.

8. Glue the main wing (③ + ④) firmly to the fuselage aligning the center line of the main wing with the center of the fuselage top. In order to glue the main wing precisely and securely to the fuselage, smooth the fuselage top flat with a pencil before applying the glue.

5. Using a pencil and a ruler, connect the two pinholes to make the center line of ⑤. Glue ⑤ onto the fuselage top aligning their center lines and rear edges.

Camber the wings carefully. Dot towards the front.



9. Fold ⑤ up slightly along the center line and glue it onto the center of the main wing.

10. After the plane dries thoroughly, camber the main wings slightly with your fingers.

11. Using the dihedral angle gauge, make sure the dihedral angle for the main wing is 15°.

12. View the plane from both the front and the back and straighten any warps or bends in the wings.

Whiterings Racer 527 Sky Fish

● GLUING INSTRUCTIONS

Glue the parts together in the order indicated. Use the balsa marked A-2 for this model.

4. Glue ⁴ to the underside of ³ aligning their center lines.

7. Place a ruler along the center line of the main wing (³ + ⁴) and bend each side up individually to make a dihedral angle of 15°.
(Use the dihedral angle gauge.)

8. Glue the main wing (³ + ⁴) firmly to the fuselage aligning the center line of the main wing with the center of the fuselage top. In order to glue the main wing precisely and securely to the fuselage, smooth the fuselage top flat with a pencil before applying the glue.

2. Glue ¹ and ² to both sides of the balsa body aligning their edges flush with those of the plane nose.

Dot toward the forward

6. Using a pencil and a ruler, connect the two pinholes to make the center line of ⁵. Glue ⁵ onto the fuselage top aligning their center lines and rear edges.

Dot towards the front.

Dot towards the front

9. Fold ⁶ up slightly along its center line and glue it onto the center of the main wing.

Camber the main wing carefully.

Dot towards the forward

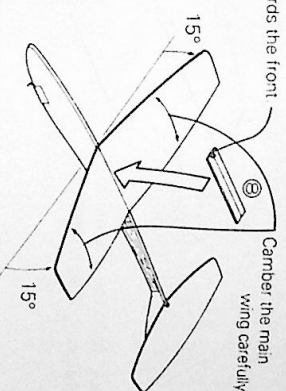
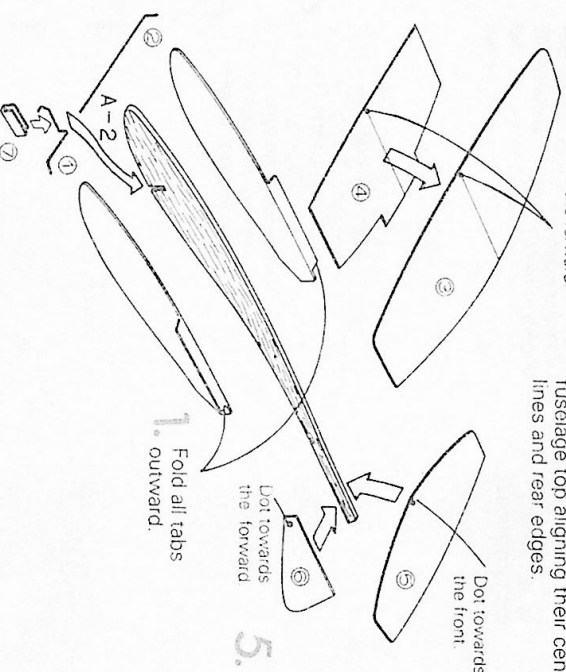
1. Fold all tabs outward.

5. Attach the vertical stabilizer ⁶ to the left hand side of the fuselage ensuring that the rear edge of both ⁶ and the fuselage meet flush. Also, align their upper edges.

10. After the plane dries thoroughly, camber the main wing slightly with your fingers.

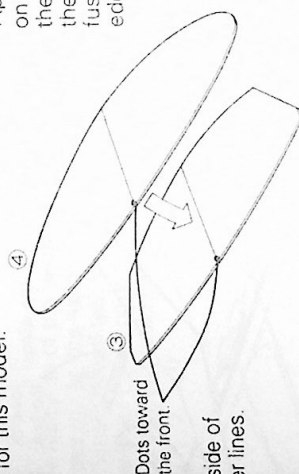
11. Using the dihedral angle gauge, make sure the dihedral angle for the main wing is 15°.

12. View the plane from both the front and the back and straighten any warps or bends in the wings.



GLUING INSTRUCTIONS

Glue the parts together in the order indicated. (Use the balsa marked L for this model.)



4. Glue 3 to the underside of the fuselage, aligning their center lines.

7. Place a ruler along the center line of the main wing (3 + 4) and bend each side up individually to make a dihedral angle of 15°. (Use the dihedral angle gauge.)

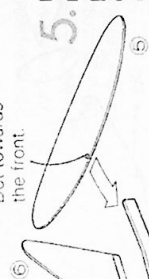
2. Insert the hook into the fuselage and secure it by gluing on balsa 2.

3. Glue 1 and 2 to both sides of the fuselage, aligning their edges flush with those of the plane nose.

6. Using a pencil and a ruler, connect the two pinholes to make the line on 5.

Apply glue to the lower portion of the line on 5, then attach the vertical stabilizer 6 to the right hand side of the fuselage ensuring that the line of 6 and the upper edge of the fuselage to meet flush. Also, align the rear edge of 6 with the front edge of 5.

Dot towards the front.

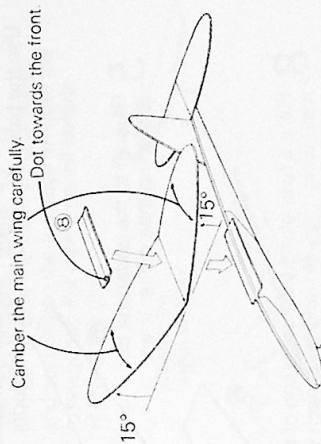


5. Using a pencil and a ruler, connect the two pinholes to make the center line of 5. Glue 5 onto the fuselage top aligning their center lines and rear edges.

Dot towards the front.

1. Fold all tabs outward.

8. Glue the main wing (3 + 4) firmly to the fuselage aligning the center line of the main wing with the center of the fuselage top. In order to glue the main wing precisely and securely to the fuselage, smooth the fuselage top flat with a pencil before applying the glue.



Camber the main wing carefully

Dot towards the front

9. Fold 9 up slightly along its center line and glue it onto the center of the main wing.

10. After the plane dries thoroughly, camber the main wing slightly with your fingers.

11. Using the dihedral angle gauge, make sure the dihedral angle for the main wing is 15°.

12. View the plane from both the front and the back and straighten any warps or bends in the wings.

Whitewings Prop Liner

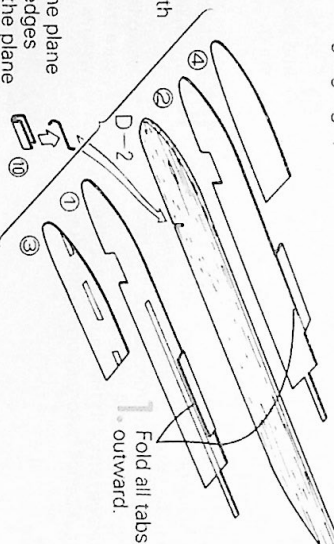
• GLUING INSTRUCTIONS

Glue the parts together in the order indicated. Use the balsa marked D - 2 for this model.

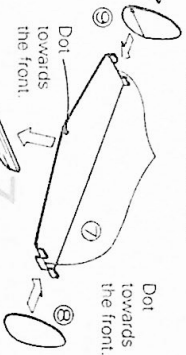
5. Glue ⑥ to the underside of ⑤ aligning their center lines.

8. Place a ruler along the center line of the main wing (⑤ + ⑥) and bend each side up individually to make a dihedral angle of 10° . (Use the dihedral angle gauge.)

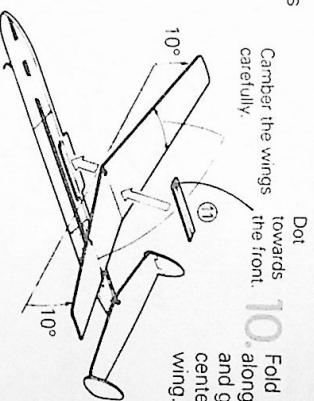
2. Glue ① and ② to both sides of the balsa body aligning their edges flush with those of the plane nose.
4. Glue ③ and ④ to the plane nose aligning their edges flush with those of the plane nose.



6. Fold both tabs of the horizontal stabilizer ⑦ correctly as shown and glue the vertical stabilizers ⑧ and ⑨ to the tabs of ⑦, aligning the rear edges. Using a pencil and a ruler, connect the two pin holes on the vertical stabilizers. Then, line up the lines on ⑧ and ⑨ with the folded tab lines on the horizontal stabilizer.



7. Glue ⑦ + ⑧ + ⑨ onto the fuselage top, aligning their center line and rear edges.



9. Glue the main wing (⑤ + ⑥) firmly to the fuselage aligning the center line of the main wing with the center of the fuselage top. In order to glue the main wing precisely and securely to the fuselage, smooth the fuselage top flat with a pencil before applying the glue.
11. After the plane dries thoroughly, camber the main wings slightly with your fingers.
12. Using the dihedral angle gauge, make sure the dihedral angle for the main wing is 10° .
13. View the plane from both the front and the back and straighten any warps or bends in the wings.

ALONG INSTRUCTIONS

parts together in the order indicated.
parts marked D-2 for this model.

*1 The folded line on the unprinted side can be used as the standard for the center line of the main wing. In order to be more accurate, make pinholes at both ends of the center line on the printed side. Turn the main wing over and link the pinholes together with a ruler and then draw a line on the unprinted side of the main wing.

6. Glue ③ to the right side of the vertical stabilizer on part ④, at the same time attaching its bottom folded tab to the top of the fuselage. (The upper folded tabs of both ① and ③ should naturally line up evenly.)

7. Using a pencil and a ruler, connect the two pinholes to make the center line of the vertical stabilizer. Glue ⑦ onto the folded tabs of the vertical stabilizer.

1. Fold all tabs outward.

2. Glue ① and ② to D-2 on the sides of the fuselage, aligning their edges flush with those of the plane nose.

4. Glue ③ and ④ to the plane nose, aligning their edges flush with those of the plane nose.

3. Insert the hook into the fuselage and glue on folded ⑤.

5. Glue ⑥ to the underside of ⑤.

9. Glue the main wing firmly to the fuselage aligning the center line of the main wing with the center of the fuselage bottom. (Refer to *1)

In order to glue the main wing precisely and securely to the fuselage smooth the fuselage top flat with a pencil before applying the glue.

Camber the wings carefully.

Dot towards the front.

8. After the main wing dries thoroughly, place a ruler along the center line of the main wing and bend each side up individually to make a dihedral angle of 10°. (Use the dihedral angle gauge.)

10. After the plane dries thoroughly, camber the main wing slightly with your fingers.

11. Using the dihedral angle gauge, make sure the dihedral angle for the upper main wing is 10°.

12. View the plane from both the front and the back and straighten any warps or bends in the wings..

Whitewings Fan Liner

• GLUING INSTRUCTIONS

Glue the parts together in the order indicated. Use the balsa marked D - 2 for this model.

1. The folded line on the unprinted side can be used as the standard for the center line of the main wing. In order to be more accurate, make pinholes at both ends of the center line on the printed side. Turn the main wing over and link the pinholes together with a ruler and then draw a line on the unprinted side of the main wing.

6. Using a pencil and a ruler, connect the two pinholes to make the center line of 7. Glue 7 onto the fuselage top aligning their center lines.

7. After the main wing dries thoroughly, place a ruler along the center line of the main wing and bend each side up individually to make a dihedral angle of 10° . (Use the dihedral angle gauge.)

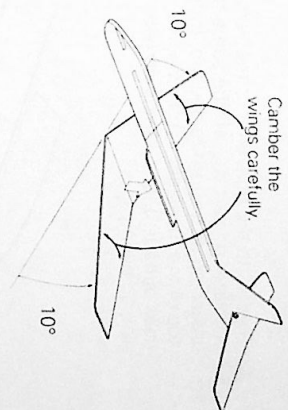
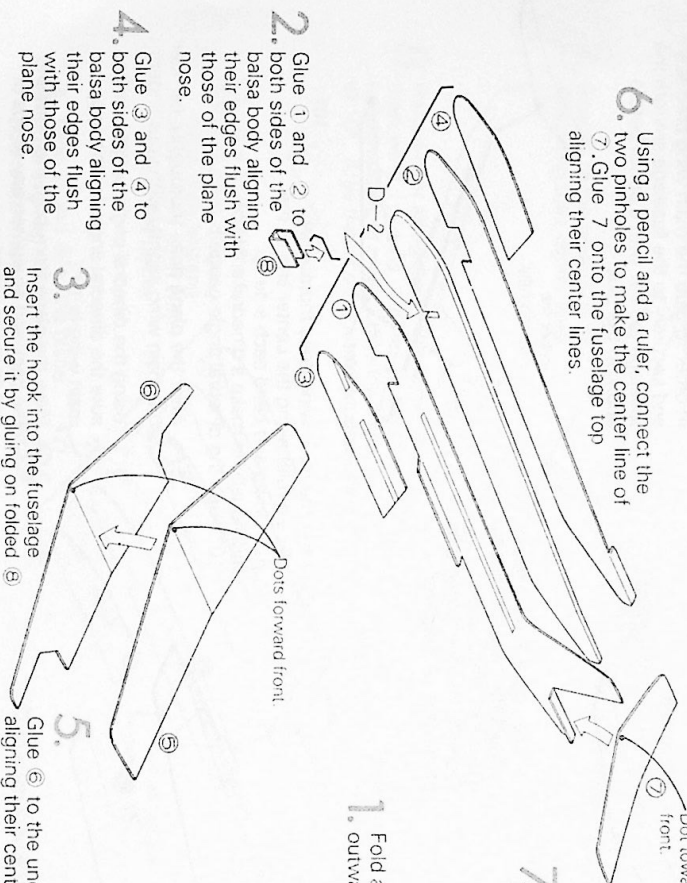
1. Fold all tabs outward.

8. Glue the main wing firmly to the fuselage aligning the center line of the main wing with the center of the fuselage bottom. (Refer to * 1) In order to glue the main wing precisely and securely to the fuselage, smooth the fuselage top flat with a pencil before applying the glue.

9. After the plane dries thoroughly, camber the main wing slightly with your fingers.

10. Using the dihedral angle gauge, make sure the dihedral angle for the upper main wing is 10° .

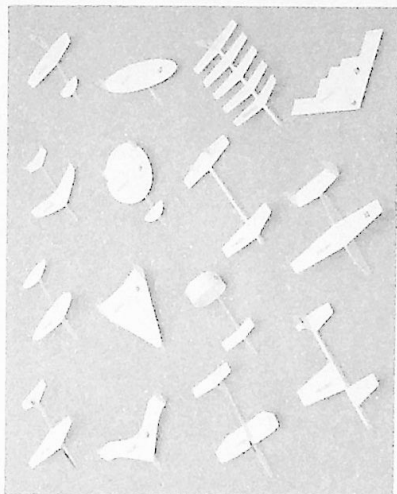
11. View the plane from both the front and the back and straighten any warps or bends in the wings.





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EXCELLENT GLIDERS

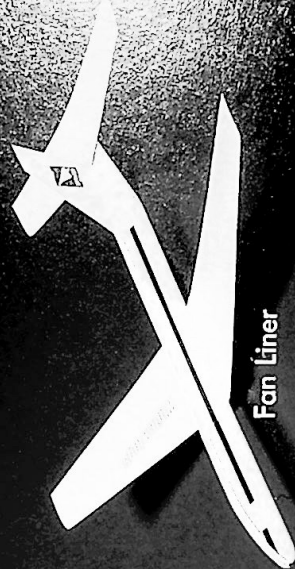
6 BALSA/FIBER MODELS
PRE-CUT KIT



Prop Liner



Jet Liner



Fan Liner



Racer 508 Sky Cub



Racer 527 Sky Fish



Racer 531 Pheasant

WhiteWings

Age: 8 through adult
AG Stock No. AG66

White Wings

Pre-cut Volume 1

EXCELLENT GLIDERS



YASUAKI NINOMIYA

Whitewings Excellent Gliders are designed by the world's leading paper airplane designer. Trained in microwave physics and recognized as a pioneer in microwave communications engineering, he has been fascinated by paper airplanes since early childhood. Dr. Ninomiya has created over 1,000 original designs from racer to profile. His designs won the grand prizes for Distance and Time Aloft in the First Great International Airplane Contest (Pacific Basin Region) in 1967. Dr. Ninomiya was invited to participate as a judge in the Second Great International Contest in 1985, and has been asked to do so again in the third contest.

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